Shots in the dark

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Learn about those explosions you might have heard or seen last week

Last week, local social media was abuzz with comments about loud booms and flashes coming from the Lab. That's because on four nights, a total of eight explosive tests were detonated at Minie firing site on Threemile Mesa, just a few miles from White Rock.

"These were unusually visible and audible explosives experiments," said Peter Dickson, group leader for Explosive Applications and Special Projects, which was responsible for the experiments. In fact, Dickson, while making sound level measurements on a ridge just west of White Rock, took the photo you see here with a regular DSLR camera.

The shots — particularly the larger shots fired on Dec. 3 and 4 — were especially noticeable because they took place at night. "We were testing some optical sensors, and we wanted to see just the light from the explosions," Dickson explained. "We didn't want them polluted with sunlight."

The logistics of detonating explosives at night aren't that much different from detonating them during the day. About a dozen people were involved, some in a concrete bunker near ground zero, others safely distanced on nearby mesas. Access control and the Los Alamos Fire Department were also aware of what was going on. "A Shot Review Committee convened about a week before to assess the risks of wildland fire and safety aspects," explained M Division Leader Chuck Mielke. "We have well-defined conduct of operations in M Division for intentional firing operations."

As the high-explosives firing leader for this shot series, M-6 research technologist Angelo Cartelli was responsible for operational control of all activities at the firing site, including access, explosives safety, personnel safety, and the safety of property and equipment. "Safety is key," he said. "I want to go home to my family the same way I came into work, so planning and preparation is essential for success."

In addition to testing optical sensors, these explosives experiments were an opportunity to develop a better understanding of how sounds from these shots propagate in the atmosphere under different atmospheric conditions. "We have a predictive computer model of sound propagation over the Pajarito Plateau, and we're refining that using SODAR data," Dickson explained, "which uses reflected acoustic waves to infer temperature, wind speed, and wind direction at different heights above the ground. It turns out that variation in wind direction and speed as a function of height above the ground is the primary cause of atmospheric focusing of blast waves from explosive

tests, which in turn determines how loud these shots are in different directions and at different distances."

Like all shots done on Lab property, last week's shots were not nuclear. The Laboratory's explosives research mission extends well beyond nuclear weapons applications. "It covers weapons safety, industrial explosives safety, 'green' explosives research, global security problems related to explosives, counter-terrorism issues, operational support for military customers, and basic explosive science and shock physics," Dickson explained. "Los Alamos works on all of those things."

So the next time you hear a boom coming from Threemile Mesa or one of the other Los Alamos test areas, know that it's just the Lab furthering its understanding of explosives to help make our country — and the world — a safer place.

"Knowing the importance of this type of work and the role it plays is gratifying," Cartelli said. "Anyone who knows me knows how much I value the security and safety of our nation — not only today but for future generations. I am happy and so incredibly lucky to be part of this legacy at Los Alamos."

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